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ACTIVITY IN NORTHWEST CANADA*

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Discovery and exploration in northwestern Canada was mainly the work of fur traders. There were two lines of approach to the region. The servants of the Hudson's Bay Company worked their way westward from forts and factories at the mouth of Churchill and Nelson Rivers, while the Northwest Company, based on Montreal, used the far longer and more hazardous route by the Great Lakes and Saskatchewan River. Both led explorers to the rim of a vast basin whose waters ran down neither to Hudson Bay nor to the Atlantic, but to the Arctic Ocean. Of several routes across the "height of land" into this basin, one became of prime importance —that leading to Athabaska River by way of Clearwater River. It was by this route that a Connecticut Yankee, Peter Pond, pioneered the way to Lake Athabaska in 1779 and set up a trading post surrounded by a vegetable garden that was a wonder to Indians and white men alike. Following him came Alexander Mackenzie, a Scot in whom ability as a trader was combined with the urge to explore. His search for a way to "The Western Sea" led him to the Arctic Ocean and later westward by Peace River and across the mountains to the Pacific. Following these pioneer journeys of 150 years ago the pattern of lakes, rivers, plains and mountains has been filled in so that there are now few untraveled routes in the Canadian northwest. Much of the exploration was by fur traders supplemented in the past fifty years by government scientists and surveyors, missionaries and prospectors.

A new group of pioneer explorers arrived after the first world war. They used aeroplanes in a region where flying was previously unknown and in the face of problems of winter flying that had not

* Thanks are due to the Hudson's Bay Company for transportation and the free use of their other facilities. The author is particularly indebted to Mr. David Hutchison, Manager of the Transport Division.

at that time been encountered elsewhere. These pioneer "bush fliers" experimented with the use of skiis for landing on snow and frozen lakes, with methods of starting and running engines at fifty or more degrees below zero, and on one occasion manufactured two aeroplane propellers from sledge boards and moose glue to enable damaged planes to escape before the rivers and lakes froze them in.

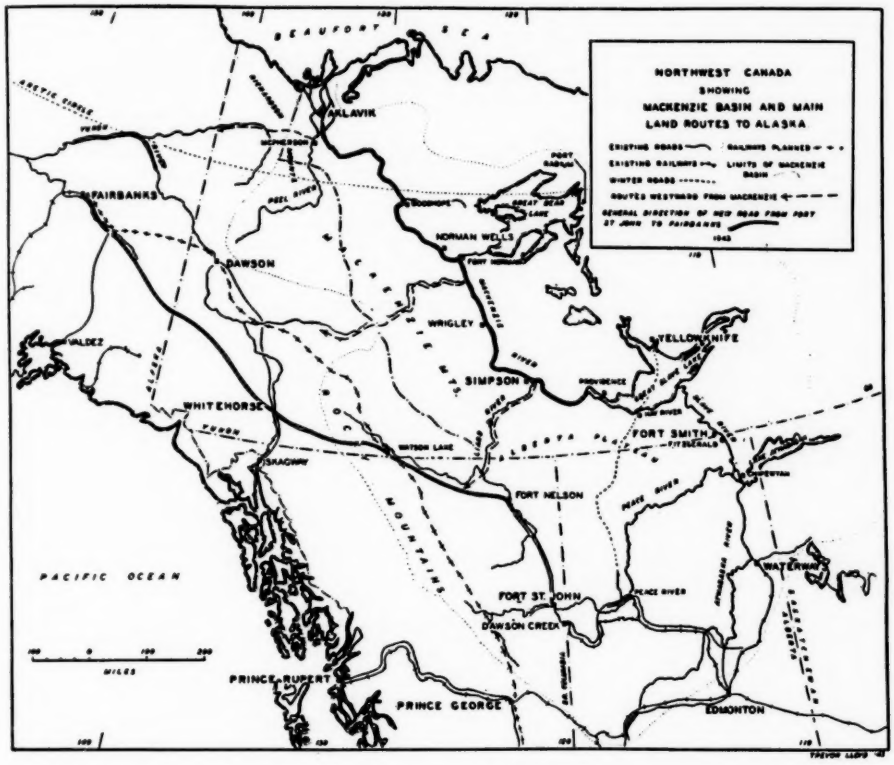
Northern travel today is a curious mixture of methods familiar a hundred and fifty years ago with those of today. Large modern planes using landing fields or lakes and rivers in summer or winter are used extensively. Yet the pilot and his mechanic must be ready at any time to live and travel on the ground in case of mishap. They are usually expert with a rifle, a canoe, or a sled, and occasionally depend for existence on the same skills as were needed by Peter Pond or Mackenzie. Between the aeroplane and the dog sled there is a variety of means of travel. In summer one may see skin boats of the mountain Indians near Fort Norman; an occasional birch bark canoe; factory-made canoes with outboard engines used by Indians, white trappers and traders; gasoline launches; tugs; steamboats and large barges. Little freight moves in winter, but some is carried by trains of heavy sledges hauled by Diesel tractors. Here and there is a "snowmobile"—a sled driven by an aeroplane propeller. Transportation in northwestern Canada is thus the key to its development, and the explanation of the surprisingly backward condition of so much of an area known to white men for a hundred and fifty years.

THE REGION

The North American Cordillera trends toward the northwest so that its eastern front in northern British Columbia is almost a thousand miles further west than it is in Colorado. The main range dies away in about latitude 60° where Liard River cuts thru from the west to join Mackenzie River, but mountains of equal height and less well known (Mackenzie Mountains) rise to the north and follow a more westerly trend. Still further north is a lesser range, the Richardson Mountains. This long mountain barrier on the western side of Mackenzie basin is crossed by few passes. In the south the most famous is Yellowhead Pass used by the main line of the Canadian National Railways at Jasper. About three hundred miles north is Peace River Pass used by Mackenzie in 1793. Liard River already referred to enters by a third pass, and in latitude 64° is

Christie Pass crossed only once, nearly forty years ago, but likely to become important as a wartime route. The most northerly pass is by Peel River near the Arctic Circle. There are thus only five useful passes in 1,300 miles, emphasizing the effectiveness of the mountain barrier.

Mackenzie Basin, which receives particular treatment here, lies mainly to the east of these mountains. Its area is about 680,000



MAP 1. Northwestern Canada, showing land and water routes and settlements.

square miles, and it is 900 miles across at the widest point. The trend is from southeast to northwest, following the line of the mountains so that while Lake Athabaska is in the longitude of Denver, Aklavik at the northern point lies far west of the longitude of San Francisco. The basin is made up of parts of three distinct physiographic provinces. On the west the Cordillera, east of it a continuation of the Great Plains of the United States and Canada and along the eastern margin an important area of pre-Cambrian rocks known variously as the Laurentian plateau or Canadian

Shield. This threefold division of mountain, rolling lowland and rocky plateau has had profound influences on the development of the area.

Any superficial appraisal of the climate[1] of northwestern Canada is certain to be misleading. The area is large and there are great differences in latitude and elevation. The Cordillera forms a barrier which is in general a "climate divide" altho Pacific air masses sometimes reach Mackenzie valley. In general the climate is one of extreme continentality with a mean temperature range between January and July of up to 95° F. (Fort Good Hope extreme January minimum is —62° and corresponding July maximum 95°.) January temperatures in the area show considerable increase from north to south, while in July there is little difference. Between Athabaska Landing (lat. 55° N) and Good Hope (lat. 66° N) there is a difference in January mean temperatures of 23° (—0.5° and —22.9°), the corresponding figure for July being almost zero (both about 59.0°). Latitude is of importance here in winter but not in summer. Cold as are the winters of the lower Mackenzie valley, temperatures are about 30° warmer than in the portion of Siberia with corresponding position. Winters are modified by occasional masses of warmer air from the Pacific, so that when such circulations are strong it may be 30° warmer than the average. (For example: Fort Good Hope, February 1920, 0°, February 1925, —33°). Under such influences temperatures may rise to 45° in midwinter, but at other times may fall to —70°.

It would be misleading to imply, as some have done, that while winters are cold, summers are uniformly mild. Maximum temperature means show that the mercury climbs to 90°, both in central Alberta and on the lower Mackenzie. Minimum readings on the other hand give a truer picture of the hazards to crop growers. There is little difference in July mean temperatures between Grande Prairie in Alberta and Good Hope on the Arctic Circle, but the summer is short at Good Hope and temperatures of 28° are to be expected in July. At Fort Smith 60° N. latitude with a July mean of 60°, in 1942 the mercury fell to below 50° on every night between June 1 and September 1, and the weather always felt chilly in the evenings when the sun was obscured. In summary,

[1] See Connor, A. J., *Temperature and Precipitation of Northern Canada,* Ottawa, for station records.

while sun temperatures may be high and days are long, the fact remains that at Fort Smith the annual mean is 24° and at Fort Good Hope it is 17°. This means that the ground is never warmed to any great depth and frozen soil is to be expected within the depth of cultivation. In spite of these evidences of the severity of the climate, it must be recalled that the Mackenzie valley is warmer than corresponding latitudes in eastern Canada. Isotherms show a "gulf of warmth" extending down the Mackenzie valley. The summer isotherm of 56° runs northwestward from the latitude of 50° in Labrador to that of 70° at the mouth of the Mackenzie.

Hours of daylight are long in summer. Fort Simpson has three hours more than Ottawa for the summer months, which amounts to 18 days of additional sunshine in the months when growth is possible. There is still lack of agreement about the action of such extra hours of sunlight on plant growth in high latitudes.[2] There is no lack of evidence of the speed of growth of crops in the northern summer when moisture is adequate.

TRANSPORTATION

Northwestern Canada is of importance today for two distinct reasons. It lies across the mainland and air routes connecting manufacturing regions of the United States and Canada with Alaska and beyond that with Siberia and south and east Asia. Secondly the natural endowment of the area makes it possible that mineral production will be large in the future, and that at any rate in the southern part fairly dense settlement can be achieved. These two aspects are not distinct. As a route to the far northwest the area is more useful if it can supply fuel or personnel to aid transport, and its future internal development is more likely if adequate routes are available.

It is improbable that a water route across the north of Canada linking Atlantic and Pacific will ever be of commercial importance. Ice conditions alone make it far more hazardous than that along the north coast of Siberia. Each year one or two trading schooners voyage from the Mackenzie delta eastward to about longitude 100°. At one time they were supplied by a ship based on Vancouver, but after several catastrophies it was decided that navigation around northern Alaska was too uncertain. For this reason it is not prac-

[2] Albright, W. D., "Crop Growth in High Latitudes," *Geog. Review*, Vol. 23, 1933.

ticable to establish a line of water communication for freight down Mackenzie River and westward to Bering Sea. The journey could be made in many seasons but not with any assurance or much safety.

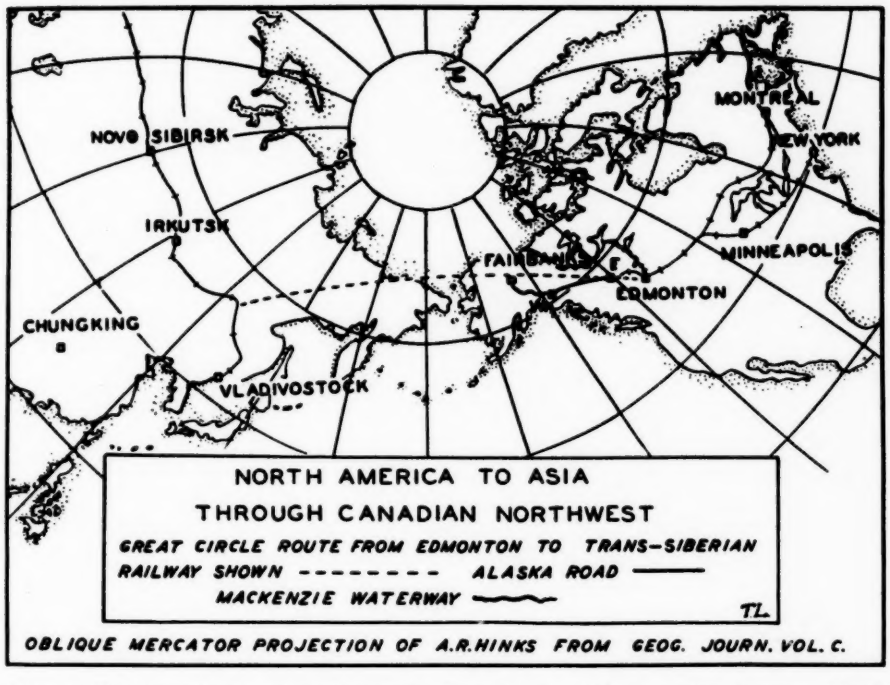
Some years ago the government of British Columbia undertook a project which, if it had been completed, would be of value today. There is a "natural" northward route thru the middle of British Columbia often referred to as the Rocky Mountain Trench. A railway was planned to run by this route connecting the southern part of the Province near Vancouver with Prince George on the Canadian National Railways and thence northward toward the Yukon. When Alaska's isolation became of strategic importance in 1938, this route, later referred to as "Route B" was strongly urged as the best line for a road to Alaska. In spite of certain physical advantages and the fact that much of the route had been surveyed, it was not used.

The first overland link with Alaska was a chain of airfields built by the Canadian Government just before and during the early years of this war. Many of them were inaccessible except by aeroplane, and some of the meteorological stations which served them were even more remote. The main fields were built at Fort St. John beyond the end of steel near the boundary of British Columbia and Alberta, Fort Nelson on Fort Nelson River about 80 miles above its junction with Liard River, Watson Lake near Liard River where it crosses the Yukon boundary and at Whitehorse about 120 miles inland from Skagway. Selection of a route for an Alaska Highway was influenced by the existence of these airfields and the urgent need for linking them by a supply route. Fort Nelson, for example, could be reached by way of Liard River, and this was the route by which gasoline supplies had to be carried in. The Alaska highway[3] was thus intended to be, and is, an emergency military road which took considerable engineering skill and hardihood to build. The physical obstacles include a long cold winter, with January temperatures at Fort St. John of —27°, a short and fly-infested summer in which temperatures rise to 95°. In the intervening seasons, especially in spring, the ground is muddy and the rivers partly filled with floating ice. "Muskeg," a treacherous swamp with scattered stunted spruce is widespread and mountain torrents crossing the line of the road, offered difficulties in bridging. The wooden bridges in use in summer or winter are all likely to

[3] Edelstein, Julius C., *Alaska Comes of Age,* Institute of Pacific Relations, 1942.

be swept away in the spring thaw, and the road itself may for some months become a morass. In view of the speed of the project, the nature of the terrain and the purpose for which the road was built, it is wrong to expect a "Tourist Highway" in anything but the distant future.

At present every possible way to Alaska must be used, and the sea route, reduced in value because of the lack of ships and sub-



MAP 2. The importance of northwestern Canada as a link in routes between North America and Asia is apparent. Both the Alaska road and the Mackenzie waterway lie close to the great circle course from Edmonton to the trans-Siberian railway. After a map appearing in the *Geographical Journal,* Vol. C, No. 1.

marine dangers, and the land routes already mentioned can be supplemented by an inland waterway. It is natural that the traditional highway of the fur trade for a hundred and fifty years should be considered. At a first glance on the map there is a magnificent natural route from Athabaska River near Edmonton to the sea, an airline distance of more than 1,200 miles. At one point on the Mackenzie River it is within three hundred miles of navigable water on the Yukon system. Here is a potential summer route of obvious value. More careful study shows that while in regular use

by steamers for nearly fifty years there are definite limitations to the use of the route for shipping large tonnages. The effective head of navigation is three hundred miles north of Edmonton at Waterways, reached by a rather primitive railway. In some years the river and Athabaska Lake are difficult to navigate with large barges and boats. The three hundred miles separating the Mackenzie and Yukon systems include a range of mountains with peaks rising to 8,000 feet, until 1942 virtually unexplored and a serious barrier. Mackenzie waterway is nevertheless the main supply route for trading posts and mines in the western part of the Northwest Territories, and more than 30,000 tons moved north along it in the summer of 1942. For adequate development the region must have a network of transport routes available at all seasons. This will need to include land, water and air complementing one another. Heavy and bulky freight will continue to go by water from June to October, other freight and passengers may go by roads usable in both summer and winter. Aeroplanes will be needed to carry mails, urgent freight and passengers, and to supply a certain means of communication in the difficult Spring and Fall seasons, when both roads and rivers may be unusable.

Spectacular developments in northern flying are likely following the war. Landing fields being built now for military purposes will continue in use for civilian flying. In addition to the route already referred to from Fort St. John to Whitehorse and Fairbanks, other logical developments are a line of flying fields following the Mackenzie River and another linking this line with more easterly routes crossing Baffin Island and Greenland. There will continue to be ample scope for "bush flying" both to "feed" the main lines and to keep contacts with isolated mining and trading settlements. So much for the Canadian northwest as a stepping stone to other places. What of it as a region with possibilities of internal development?

Internal Development

In the past its economy has depended almost exclusively on fur trading. All of the settlements of Mackenzie basin except Yellowknife, Port Radium and Norman Wells (and the latter two are small) owe their existence to it. Their names—Fort Simpson, Fort Good Hope, Fort Chipewyan, Tuktoyaktuk—recall the names of famous Hudson's Bay Company traders and their pious upbringing

or the Indians and Eskimos with whom they traded. Fur trading is still the mainstay of the north (skins to the value of about two million dollars are produced annually in the Northwest Territories) altho those from fur farms are now of more commercial importance. Altho business methods have been modernized and the products sold in exchange for the furs are now surprisingly like those in a city department store, the trade retains many of its old customs. Trade goods sent to the posts are still marked in the traditional manner with the year (or "Outfit") counted from 1670 when the Hudson's Bay Company was founded. Goods shipped to posts in the summer of 1942 were marked "273." As most of the stevedores cannot read, addresses consist of a letter and number. In time even the illiterate Chipewyan dock-worker learns to prevent any packages marked "R13" from going beyond Fort Smith. Furs baled for export from posts also carry these cryptic markings with the addition of a metal seal placed there by a constable of the Royal Canadian Mounted Police. This is a reminder that fur-trapping in the north is carefully controlled. No white person who did not hold a license in 1938 can now secure one, apart from children of those who have lived in the Territories for four years. More than half a million square miles of "Preserves" are closed to all except Indians and halfbreeds, and in some areas trapping by anyone is forbidden. By such conservation the government hopes to guard the livelihood of scattered residents of this large area where other employment is lacking.

Fish is plentiful in lakes and rivers and is of good quality, but there is no commercial exploitation except in Lake Athabaska. From there barges pushed by tugs carry the fish to Waterways, where it is packed and shipped by rail to Edmonton and to the United States. The supply of fish in Great Slave Lake—white fish, pike, connies, and others, is large enough to permit commercial fishing, but there is no accessible market. Plans have been made for a cannery at Hay River, near the western end. Here and elsewhere Indians catch fish in the late summer and dry it on racks for winter food for themselves and their dogs. Fish, either dried or frozen, is the main dog food in the Mackenzie area.

Some mention has already been made of agriculture and horticulture. This is carried on commercially on a small scale at some settlements and for personal use at all of them. While there are government supervised experimental farms and gardens at Fort

Smith, Providence and Fort Simpson, elsewhere the gardeners depend on their own skill. Seeds are usually secured from Mail Order houses and are not selected especially for the short northern summer. In recent years the Hudson's Bay Company has encouraged its post managers to make gardens both for the aesthetic value of the flowers and the nutritional value of the vegetables. With expert advice and good seeds available there have been excellent results. Such examples are certain to increase the amount of foodstuffs grown locally. Garnet wheat is regularly harvested at the Mission at Fort Smith and fodder corn at several places as far north as Fort Simpson. Cattle and horses are numerous, perhaps the most striking example being the small farm operated by the medical officer at Aklavik on the Mackenzie delta. In summer fresh meat is obtained from river boats. Cattle, sheep, and pigs from Edmonton are fattened at Fort Smith before making their last northern journey "on the hoof."

Mining centers such as Yellowknife and Goldfields are wealthy enough to command the best of foods. Every few weeks thruout the summer refrigerator barges carry in fifty or more tons of meat, butter, ice cream, fresh vegetables and so on. These are kept in large cold storage plants at the settlements. Supplies usually run out before spring and there is competition among boat owners to arrive with the first shipment of fresh food in June. While vegetables can be grown successfully at all settlements along the Mackenzie, mining towns of the pre-Cambrian shield are usually on bare rock without even a few inches of soil. Such tiny gardens as exist are made of soil collected from swamps and crevices within a radius of several miles.

Reindeer were introduced to the Mackenzie delta from Alaska in 1935 and are now well established. The herd has increased to about 8,000 head, and Eskimos have been trained as herders. An interesting feature is the migration of the herds in spring from the inland winter ranges to the summer feeding grounds along the coast and the return inland in early winter. Winter feed is mainly reindeer moss, but summer pasture provides a variety of grasses and shrubs. The coast is attractive because of its relative freedom from the plague of flies. What to do with the reindeer meat is something of a problem. When there is too much for use among the natives it is offered to mission hospitals and schools. It is probable

that in the winter of 1943 men engaged in construction work in the Mackenzie valley enjoyed reindeer steaks.

Trees of merchantable size grow as far north as the Mackenzie River delta. Spruce and tamarack of local origin is used for building houses, barges and small boats. Sawmills operate as far north as the lower Slave River, where trees up to 28 inches diameter are cut. Higher quality finished lumber is imported from Edmonton. Steamboats burning wood operate from Waterways to the sea.

The above description of some of the natural resources of the area which support both Indians and white settlers differs little from that of generations ago. Those living at trading posts during the last century made more use of local food supplies than is the case today. The tin can has become a symbol of the North.

MINERALS

The first important addition[4] to the list of utilized natural resources came with the discovery of oil in 1920. Geologists had for a long time assumed that the eastern part of the basin, on the pre-Cambrian shield, contained a wide variety of minerals and that exploration and prospecting would locate them in time. Samuel Hearne traveled from Fort Prince of Wales at Churchill in 1771 expressly to look for copper mines which were reputed to exist on the Arctic coast. At the mouth of Coppermine River, which he explored, there is now known to be ore in commercial quantities. Yet the first mineral to be produced in the Northwest Territories was not found on the Shield but in Devonian rocks about fifty miles north of Fort Norman. Wells drilled to a depth of about 1000 feet between 1920 and 1923 produced a quantity of high grade oil, but there was no local market and the wells were capped. Exploration was carried on at other points to the south but without success. A new urge to produce oil came with the discovery of radium on the east shore of Great Bear Lake in 1930, and the wells went into production. Pitchblende from Port Radium was shipped out by air, and following the perfecting of new refining methods by Canadian government scientists it became possible to sell radium for $25,000 a gram and so reduce the world price from $75,000. Development of these remote mines was largely a matter of finding transportation

[4] Salt obtainable at the surface near Fort Smith has been used in Mackenzie area for generations.

to take in the men and equipment and send out the ore. The company used aeroplanes carrying a pay load of two tons and, during the very short season of open water, barges and tugboats moved between Fort Smith and Port Radium. The ore was taken to Port Hope in southern Ontario for refining. The mine employs about a hundred men and 115 tons of pitchblende are extracted each day. When refined the ore produces 8 ounces of radium and 40 tons of uranium salts a month. War conditions led to closing of the mine in 1940, but it was operating again in the summer of 1942.

Following the successful mining of radium and silver on the shores of Great Bear Lake, there was an intensification of prospecting in all parts of the Shield which could be reached from the Mackenzie Waterway. Gold mines opened at Goldfields at the east end of Lake Athabaska and at Yellowknife on the north arm of Great Slave Lake. The latter settlement reached a population of almost 1,500 before wartime restrictions closed some of the mines. Production of gold since 1938—mainly from one mine—has been worth about ten million dollars. Conveying the mining equipment (the Yellowknife area supplied nothing except gold ore, water and solid rock foundations) and materials for building a town and a hydroelectric plant strained the existing transportation facilities. The nearest railhead is at Waterways about six hundred miles to the south. Great Slave Lake is open to navigation from mid-June to early October, and in this period a weekly service of freight and passenger boats operates. Passengers usually travel by aeroplane and so are able to reach Edmonton in a single day, whereas a boat and rail journey may take two weeks.

In the summer of 1942 while some gold mines were closed and others reduced their output, oil production soared. Norman Wells was a ghost settlement until mining on Great Bear Lake supplied a market for Diesel oil and a refinery was erected. Mining operations at Yellowknife increased the market so that a new refinery completed in 1939 was able to supply a wide variety of oils and 87 octane gasoline as far south as Great Slave Lake. This reduced operations costs for hundreds of power boats and canoes. Oil and gasoline from Edmonton was, however, still shipped as far north as Yellowknife.

The relative closeness of Norman Wells to the Alaska highway led to plans being considered for supplying Alaska from this source. Production from the three wells was small—the refinery could

handle 840 barrels (Canadian) each 24 hours and the annual output of the wells (working only in the summer months) was only 830,000 barrels. The severe climate offered technical difficulties. There was uncertainty as to the extent of the field, and many were not optimistic about increasing production by drilling. Drilling carried out in the summer of 1942 near the site of the existing wells has increased the flow considerably and enough has been produced to make it worthwhile to consider construction of a pipe line from Mackenzie River to the Alaska highway. This undertaking is in itself a difficult one as it involves crossing Mackenzie Mountains, at present a largely unknown area. The nub of the whole problem is transportation of equipment and men to Norman Wells. At the present this is limited to the use of boats and barges in the open season and to aeroplanes thruout the year. The present northern limit of steel is Waterways, 1,000 miles to the south and the nearest good road is at Grimshaw on the Peace River on about the 55th parallel, 700 miles away.

Twenty years of sporadic mineral development in the north has produced gold, silver, radium, uranium, oil and tungsten. The government has photographed from the air an enormous area of the Canadian Shield (many of these photographs are available for teaching purposes from the Department of Mines and Resources, Ottawa), and much of it has been geologically mapped in the past ten years. Further development will probably have to await the end of the war apart from the production of such strategic minerals as oil and tungsten. When it is again possible there will be greatly improved water and land transport, and aeroplanes will not be handicapped by the freezing and thawing of rivers and lakes. If mining can attract a larger and stable population so that other settlements of the size of Yellowknife spring up, it is probable that commercial horticulture combined with trapping in winter will become an important occupation in the Mackenzie valley.

Some may be concerned about one possible consequence of such changes. What is likely to happen to the Indian population? Numbering about 3,500, they are scattered in small groups thruout the area, visiting trading posts in summer but returning to their villages in winter. In the past their welfare has been the chief concern of the Dominion government, and in spite of errors of judgment they have been well cared for. Medical service of a sort is available to them and their children can attend residential or day schools.

They are still hunters and fishers, some securing summer work as casual laborers loading freight on boats. They have taken little part in recent developments. Their fate will probably be gradual extinction—not thru any dramatic epidemic, but by merging thru intermarriage with white and half-breed settlers.

Where are new settlers for the North to come from? They will need to be experienced pioneers. Some will move northward from the Canadian prairies, others may immigrate from northern Europe. One may even hazard the guess that some of the thousands of Americans who are becoming familiar with sub-Arctic Canada may choose the Northwest as a future home.

MORSE'S SCHOOL GEOGRAPHIES: AN EIGHTEENTH-CENTURY SCIENCE TEXTBOOK SERIES USED AT THE JUNIOR-HIGH-SCHOOL LEVEL

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The first geography written by an American for American school children was published by Jedidiah Morse, father of Samuel Morse. Morse, a Congregational clergyman according to the title pages of his textbooks, published his *Geography Made Easy,* a 16-mo book of 214 pages, in 1784. By 1795 he had published a series of geographies for school use. The author thought of these textbooks as being a science series, and rightly so. A two-volume series, *Elements of Geography* and *Geography Made Easy,* intermediate books of a four-volume series, was published to be used by children at the junior-high-school level, and was so used in the last decade of the eighteenth century, and continued in use for some time thereafter. The author desired to present scientific information to youth and introduced into the series much science material emphasized in present-day junior-high-school science textbooks.

That *Elements of Geography* and *Geography Made Easy* were intended as intermediate volumes of a four-book series, and for use

by children of junior-high-school age and level, is indicated in the preface of early editions of the first mentioned book.

> This is intended as one of a *series* of books, to lead the Pupil, step by step, to perfection in the knowledge of Geography. The *first* in this series is a small "Astronomical and Geographical Catechism," for the use of children under 8 years of age, published by Mr. Samuel Hall, of Boston. The *second* is the work before us, adapted to children from 8 to 14 years old, and may be usefully read by those of a more advanced age. The *third* is *Geography made Easy,* which is an abridgment of "The American Universal Geography," and is now in use in many of the Schools and Academies in the United States, adapted to the higher classes in Schools, and the lower classes in Academies. The *fourth* is *The American Universal Geography,* containing a complete system of that Science, for the higher classes in Academies, for Colleges, and private families.[1]

Morse's geographies were used at the levels intended. Salem Town, Mrs. Lucy Lane Allen, Noah Webster, Horace Greeley, and others who attended the American district schools in the late eighteenth and early nineteenth centuries, in their writings have mentioned the use of Morse's geographies in the higher classes of those schools. The Boston School Committee's Minutes for 1789 show that Morse's Geography, abridged, was to be introduced into the Reading Schools "when found expedient." William B. Fowle (b. 1795), early Boston school teacher, in speaking of the Boston schools, has stated that, "Morse's abridgment began to be a reading book about the year 1800." At another time Fowle stated, in speaking of geography, that when he went to school, "The chief book used was an abridgment of Dr. Morse's Universal Geography, but it was *read* only, and not committed to memory." Leicester Academy, Noyes' School, Mrs. Peabody's School, Hyco Academy, and other quasi-private institutions also were using Morse's geographies, and at the junior-high-school level.

Morse wrote in the preface of *Elements of Geography,* 1795, probably with *Geography Made Easy* in mind, that his works had met with public approval.

> From the approbation which the public have been so candid as to bestow on his former works of this kind, the Author hopes to meet their encouragement in this farther attempt to render the acquisition of useful knowledge still more easy to children.

[1] The four-book series originated as follows: Morse published *The American Geography* in 1789, with the second edition (1793) and following editions being called *The American Universal Geography.* Morse's *Geography Made Easy* (appearing first in 1784) thereafter appeared as an abridgment of this larger work (e.g., 4th ed., 1794). Caleb Bingham prepared the *Astronomical and Geographical Catechism,* based upon Morse's abridgment, and it was published by Samuel Hall in 1795, a book of 32 pages. Morse published his 144 page *Elements of Geography,* first edition, in December, 1795.

As to the acceptance of *Elements of Geography,* we are told in the third edition, 1798, that:

THE favorable reception of this little book, by the public (*two* editions, amounting nearly to 8000 copies, having been sold in *two* years in this country, besides a handsome edition in England,) has induced the Author and Proprietors of this work to give a new edition, on a larger type, and of a more respectable size, with a new set of Maps, and some other improvements, without increasing the price. The alterations are so made, however, as not to affect the former editions: All the editions may be studied by the same class without inconvenience.

Morse thought of his books as science books. They were to aid the pupil in obtaining a knowledge of science. He began his *Elements of Geography* as follows:

Master. PRESUMING, my dear Pupil, that you have an inclination to obtain a knowledge of the entertaining and useful science of GEOGRAPHY, which is now taught in many of the schools, I shall devote a few hours to the pleasant task of instructing you in some of the most useful and entertaining branches of this science. I flatter myself with the hope that it will excite in you such a taste and desire for the study of it, as will lead you, as your years and opportunities will allow, to make yourself a thorough master of it.

Pupil. I hope, Sir, I have a due sense of your goodness; and shall very cheerfully, and, I trust profitably, attend your instructions.

That Morse expected the pupil to be impressed with the science material presented is shown by a comment the latter is caused to make at the end of the section on "Astronomical Geography." The pupil states that, "Astronomy and Geography must indeed be important sciences, . . ."

Morse's dominant purpose for introducing science material into the schools appears to have been that of satisfying the rational curiosity of youth by imparting to him certain factual knowledge. He stated in the preface of his *Elements of Geography* that:

Curiosity is the most prominent feature in the youthful mind, and it is the business of parents and instructors to guide and to gratify it; and by skillful management, it may be made to subserve the most useful purposes. No science is *better* adapted to gratify the *rational* curiosity of youth than GEOGRAPHY. Mr. Locke was of the opinion, that "*youth* ought to begin with this Science as an introduction to their future studies."

And again, in the preface of *Geography Made Easy:*

. . . There is no science better adapted to the capacities of youth, and more apt to captivate their attention, than Geography. An acquaintance with this science, more than with any other, satisfies that pertinent curiosity, which is the predominating feature of the youthful mind. It is to be lamented that this part of education has been so long neglected in America. . . .

A second objective could be classified as religious. At the conclusion of one lesson, e.g., the master is caused to say:

> I hope, my Pupil, from the view we have now taken of the earth, you have learned many things which you before did not understand; and that you feel disposed to utter from your heart, the words of the pious Psalmist—"OH LORD, HOW MANIFOLD ARE THY WORKS! IN WISDOM HAST THOU MADE THEM ALL: THE EARTH IS FULL OF THY RICHES; SO IS THE GREAT AND WIDE SEA."

And there was a third—a propaedeutic and motivating—objective. Morse intended to furnish the pupil with knowledge that would "facilitate his acquaintance with Geography"; and to excite in him "such a taste and desire" for the study of the "science of Geography" as would lead him, as his "years and opportunities" would allow, to become "a thorough master of it."

Both the scope of the science materials in Morse's geography textbooks, and his reasons for presenting them to school children, are very well summarized in this quotation from *Elements of Geography.*

> The *first* branch of this Science, viz. *Astronomical Geography,* as treated in this little book, furnishes the young Pupil with such a general knowledge of the heavenly bodies, as will facilitate his acquaintance with Geography, and elevate and enlarge his views of the wisdom, power and greatness of the CREATOR.
>
> The *second* branch, called *Natural* and *Subterraneous Geography,* gives a useful and entertaining general view of the component parts of the earth, and explains many of the remarkable appearances of nature.
>
> The *third* branch, called *Political Geography,* leads the Pupil to contemplate the earth as inhabited by men, gives him a general knowledge of all its most important divisions, by conducting him in a kind of *tour* through the whole of them.

The third branch above mentioned by Morse, although including such topics as mountains, rivers, soils, birds, etc., might be classified as social science. No one would deny, however, that the first two branches described comprehend science material found in present-day junior-high-school science textbook series.

An examination of the first fifty pages of *Elements of Geography* (for children 8 to 14 years of age) shows topics treated to be, viz., the solar system,—sun, planets, moon, eclipses, and comets; fixed stars and constellations; the earth—figure, motions, magnitude, component parts, natural divisions; latitude and longitude; volcanoes and earthquakes; bodies on the surface of the globe, animate and inanimate; water, salt, tides, air, heat, cold, light, winds, and clouds. In order that the reader may obtain a positive conception of the treatment of science material found in this textbook several selections are here presented—all from the branch entitled *Subterraneous Geography.*

THE earth below its surface is composed of various substances collectively called FOSSILS, a description of which is called SUBTERRANEOUS GEOGRAPHY, a branch of *Natural Geography*.

All substances dug out of mines, of whatever kind, such as metals, coal, sulphur, ochre, &c. are called MINERALS.

Such of the Minerals as can be melted and malleated or beaten out with a hammer, are called METALS. These are commonly reckoned *seven* in number, which are ranked according to their weight, in the following order: 1. *Platina*, a white metal newly discovered in the gold mines of South America, in many of its properties resembling gold. 2. *Gold*. 3. *Lead*. 4. *Silver*. 5. *Copper*. 6. *Iron*. 7. *Tin*. To these should be added *Quicksilver*. . . .

Volcanoes were described as "burning mountains" and compared to huge cannons. No mention was made of *diastrophism* in the section on earthquakes, one paragraph of which stated:

There are *two* kinds of EARTHQUAKES; *one* is caused by the action of subterraneous fires and the explosion of volcanoes, which are felt only at small distances, and at the time when volcanoes act, or just before they open. The *other* is supposed to be produced by immense quantities of inflammable air, contained and compressed in the caverns and crevices of the earth, which being greatly rarefied by internal fires, and finding no outlet, force a passage through all obstructions.

In a section on light it was said that the speed of light had been computed at 11,875,000 miles per minute.

Water and *Air* are two substances receiving much attention in present-day junior-high-school science courses. Morse wrote, concerning water, in part:

WATER is a compound of vital and inflammable air, in the proportion of 85 parts of the former to 15 of the latter. Others say, water is a compound of *fire* and *ice*. Not only dew, rain or snow and meteors, but all animals and vegetables, says Sir Isaac Newton, grow from water, and after putrefaction, return in part to water again.

Morse stated that, "The science which treats of Air is called PNEUMATICS." Air was treated as to its relationship to life and growth; as a conveyer of sound, and that sound travels farther in cold air than in hot; as to its height and the fact that *ether* was beyond; as to its pressure (15 pounds per square inch as determined by the *Air pump*) and reasons why it is not felt by man; as to the fact that it is lighter when foggy than when dry, and that it expands when heated and contracts when cold. Error creeps in, however, at one point.

Air is the proper vehicle of *sound*, and necessary to give us the sense of hearing. Where no air is, there can be no sound. Without air we should have no music, no smell, no light, nor be able to converse with each other. All *sounds*, whether loud or soft, move about 13 miles a minute.

An examination of eighteenth-century editions of *Geography*

Made Easy (for higher classes in Schools and lower classes in Academies) reveals a twenty-four page section on astronomical geography and astronomical problems, a twenty-five page section on animals, and some science material scattered thruout the political geography section. Early nineteenth-century editions, however, contained not only most of the science material found in *Elements of Geography* but additional material on such topics as the harvest moon, northern lights, magnetism, electricity, gravitation, and the rain gauge. The section on animals was abridged but questions designed to direct the pupil to the author's *American Universal Geography* as a supplementary work were added. For example (numbers are page references):

By whom was astronomy first cultivated? who first laid the foundation? 10

.....

What are comets? what is the heat of one when nearest the sun? What are fixed stars? 18

.....

What are hurricanes? 37

The treatment of science material in *Geography Made Easy* is very similar to that in *Elements of Geography* and needs no illustration. It is interesting to note, however, that while the 1796 edition of *Geography Made Easy* referred to the planet discovered in 1782 as being called *Georgium Sidus* in Great Britain and *Herschel* in France and America, the name *Uranius* was not mentioned. Early nineteenth-century editions, on the other hand, mention this name:

> In England, this planet has been called GEORGIUM SIDUS, in honor of the king in whose reign it was discovered; but in the rest of Europe, *Uranus*, and in America, it is more justly denominated HERSCHEL, in honor of its learned discoverer.

Morse's discussion of electricity as introduced into early nineteenth-century editions is interesting.

> The earth and all bodies, with which we are acquainted; are supposed to contain a certain quantity of an exceedingly elastic fluid, called the *Electric fluid*.
>
> *Lightning* is the electric fluid in the atmosphere; discharging itself, sometimes from one cloud to another, and sometimes from the clouds to the earth. This discharge occasions the awful roll, or sound, called *Thunder*.
>
> A machine, fitted up with certain appurtenances, for the purpose of exciting electric fluid, and making it perceptible to the senses, is called an *Electrical machine*. The sudden discharge of the fluid contained in the machine, gives a painful sensation to any animal placed within the circuit of its communication, called the *Electrical Shock*.
>
> That lightning and the electrical fluid are one and the same substance, has been proved by Dr. Franklin and others. Lightning strikes the highest and most pointed objects; rends bodies to pieces and sets them on fire; dissolves metals; and destroys animal life; in all of which it agrees with the phenomena produced by an electrical apparatus.

Morse mentions the fact that some fishes have the power of giving shocks. He also refers to the use of electricity in the treatment of diseases.

The 1820 edition of *Geography Made Easy* was published with Jedidiah Morse and his son Sidney as co-authors. A quotation is taken from the preface of this edition because of a reference to a memory aid.

> Another mode of assisting the memory is by an ingenious combination of the *initials* of names. The word VIBGYOR contains the initials of the seven primary colors, in the order in which they appear in the rainbow. . . .

Is there a junior-high-school science teacher who hasn't used the same memory aid in his classes, except that for most present-day teachers VIBGYOR has become "Roy G. Biv," a man's name?

CONCLUSION

Jedidiah Morse, author of several school geographies during the last decade of the eighteenth century, considered his books to be a series of science textbooks. Two of his textbooks were designed to be used at the junior-high-school level, and were so used in many schools. A considerable amount of science material was included in these textbooks. Much of the science material included in Morse's science series, compiled for, and used at, the junior-high-school level a century and a half ago, continues to be emphasized in junior-high-school science series of today. It might be claimed that Morse originated the American science textbook series for use in the public schools.

THE OZARK REGION OF MISSOURI

M. H. SHEARER AND RALPH S. HARRIS
Westport High School, Kansas City, Missouri

INTRODUCTION

The Ozark Region which includes the greater part of southern Missouri is the most attractive and interesting part of the state. It is a land of rolling hills, many beautiful streams and hundreds of square miles of hardwood forests. Within the region are found several good-sized caves and some of the largest springs in the country. Miles of concrete highways connect these places of interest. The building of Bagnell Dam on the Osage River in Miller County, creating the beautiful Lake of the Ozarks, has added much to the attractiveness of this region. While the glacial and loessial region of Missouri north of the Missouri River is much richer agriculturally than the Ozark Region, the latter has contributed much to the state's rank in the production of certain commodities (Figs. 1, 2). It is the purpose of this article to present some of the essential facts concerning the physiography and economic geography of the Ozark area.

Fig. 1. Physiographic regions of Missouri.

CLIMATE

The Ozark Highlands are part of a large section of the United States having the type of climate known as humid continental with long summers.[1] The annual range of temperature is about 45° F. The January average is 33° and the July, 76° at Springfield. Ex-

[1] Trewartha, Glenn, *Introduction to Weather and Climate*, McGraw-Hill Book Co., Inc., New York, p. 308.

treme temperatures range from 5° or 10° below zero to 100° or 105° above. The average date of the last killing frost in spring is about April 15 and the first killing frost in autumn about October 15. The length of the growing season is approximately 180 days. The average annual number of days when the temperature reaches 90° or better is from 30 to 35.

"The difference in topography is not sufficient to cause any marked difference in the climatic features of the so-called lowlands and plateaus. It frequently occurs that in late spring, fruit is killed in the valleys by frost while that on the hills escapes injury. This is the result of air drainage."[2]

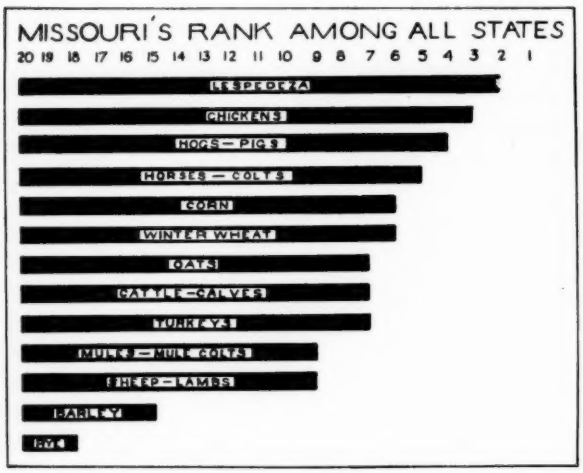

Fig. 2. Agricultural production.

Average annual precipitation varies from 40 inches in the north to 50 inches in the southeastern section of the Ozark Region. Total annual snowfall is from 10 to 20 inches. Snows are light and usually melt in a few days. There is a distinct summer maximum in rainfall, four to five inches of rain falling in each of the summer months. The average growing season rainfall, from March to September inclusive, is 25 to 30 inches.

The daily weather of the Ozark Region is often erratic due to quick shifts in the wind direction caused by cyclonic disturbances. Hot waves accompanied by drought may occur in summer and cold waves in winter. The season for tornadoes is late spring and early summer.

General Surface Relief

In the distant geological past a mass of igneous rock, mainly granite, under tremendous pressure, was forced upward in the locality that is now southeastern Missouri. The outcropping of this rock constitutes the most rugged and sparsely populated section of

[2] Miller and Krusekopf, *Soils of Missouri,* Missouri College of Agriculture, p. 16.

the Ozarks. The expression "St. Francis Mountains" is applied to these hills. Locally, many of the smooth rounded masses of granite, which rise 600 or 700 feet above the adjacent valleys, are called "Knobs," and the entire section is often called the "Knob Country." The highest regions of the state are in the vicinities of Madison, St. Francois and Iron Counties. The highest point in the Ozark region is the summit of one of these granite knobs, Taum Sauk Mountain, in Iron County, 1800 feet above sea level. Resting on all sides of this huge granite uplift are layers of sedimentary rock that slope gently downward in all directions (Fig. 3). The bedrock in Missouri is mainly limestone, shale and sandstone. Erosion has removed the overlying sediments in Iron, St. Francois and Madison counties where the granite outcrops form large, round hills. In the area surrounding the granite hills the surface relief is very rugged and is largely the result of stream erosion in the sedimentary rocks.

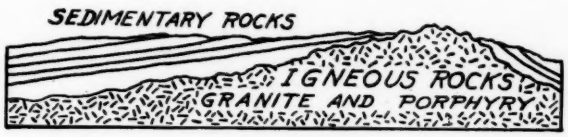

Fig. 3. In southeastern Missouri igneous rocks outcrop to form the highest points in the state. From these high points in Iron County sedimentary rocks slope away in all directions. (From *Geology of Missouri,* by E. B. Branson.)

In the northern part of the state the bedrock is essentially horizontal, while in the southern part it slopes gently away from the highest point of the Ozark uplift. One sedimentary layer which outcrops near this high point is about 1,000 feet below the earth's surface on the western border of Missouri. The lowest point of the state, 225 feet above sea level, is in extreme southeastern Missouri, Pemiscot County, in the flood plain of the Mississippi River.

As a result of fairly abundant rainfall and the slope of the land, stream erosion is effective in the Ozark area. The streams are almost entirely consequent and the drainage pattern is dendritic (tree-like). Very little swamp land is to be found in this region. The valleys of the streams are young or mature, some having very steep sides. A number of the streams (Osage, Meramec, Gasconade and White rivers) have intrenched meanders in parts of their courses.[3] Advantage is taken of such a formation in the creation of the Lake of the Ozarks by the construction of Bagnell Dam. In the region of

[3] Sauer, Carl O., *Geography of Ozark Highland,* University of Chicago Press, 1920, p. 23.

the St. Francis Mountains many of the valleys are 500 to 700 feet deep. Railroads are scarce in this area. Another section of similar hilly topography is to be found in extreme southwestern Missouri in the White River country. Here again a large beautiful lake, Lake Taneycomo, has been created by a dam across a deep valley. Outside of these rougher sections of the Ozark region the land surface presents, in the main, rolling hills of moderate slope, not unlike the morainic hills of Wisconsin. Toward the west in the Springfield area the land is less hilly and here is to be found some excellent agricultural land. Wappapello Dam located in the southeastern part of the state in Wayne and Butler counties has recently been completed. The project was designed specifically as a flood control measure for the St. Francis River and the lake is second in size to the Lake of the Ozarks.

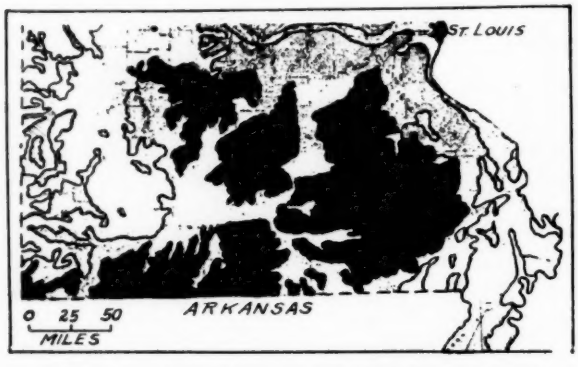

Fig. 4. Southern Missouri soil classification based on various soil surveys. Black areas are definitely submarginal for crops. The next shade, soils now used for crops, much of which should apparently be retired from such use. Next shade, soils of moderate fertility. (From preliminary report of Missouri Planning Board, 1934.)

SOILS AND AGRICULTURE

The best soils in the Ozark region are the alluvial deposits found in the valleys of many streams. Even in the roughest part of the area there are valley lowlands on which farming to some degree is possible.

In general it may be said that residual soils are poorer than transported. Residual soils depend largely upon the nature of underlying bedrock. These soils are likely to be mature and in general are poorer than immature soils. Missouri illustrates these points. The richer soils in northern Missouri are largely derived from glacial drift, loess and alluvium. In the Ozark region residual soils derived from cherty limestone and sandstone are poorer (Fig. 4). This is reflected in the percentage of improved farm land per county. North of the Missouri River from 60 to 90 per cent of the

land is improved while in a large section of the Ozark Region there is less than 20 per cent.

Over much of the area the light soils support a forest of deciduous trees. Oak predominates over most of the entire region.[4] Hickory, elm, gum, walnut and catalpa are of lesser importance. On June 30, 1941, 1,235,720 acres of land in the Ozark Region were national forest land according to the U. S. Forest Service.

"The Ozark Region is first of all best adapted to livestock farming and forestry."[5] For the most part the soils are too light to permit profitable farming of cultivated crops. Experiments show that mixtures of grasses such as orchard grass, timothy, redtop, Kentucky bluegrass, brome grass, native prairie grass, lespedeza, alsike clover, red clover, native wild legumes, Bermuda grass and Johnson grass will produce pasture suitable for livestock.[6] Fertilization of the soil is quite often necessary to secure a good first stand of grass.

Dairying is practiced only to a limited extent. There are no large cities in southern Missouri to constitute markets demanding great quantities of dairy products. Another handicap to the dairy industry is the fact that the light soils dry out quickly in summer, often resulting in deficient pastures. On the other hand, the beef breeds, especially the Hereford and Shorthorn, are better adapted to roaming the grass and tree-covered hills and are thus able to secure sufficient forage. Usually these cattle are not fattened because of the shortage of corn. Here then is a region of considerable potentiality in the production of lean, grass-fed cattle which can be sold to corn-belt farmers for fattening. However, much depends on the success of starting and maintaining a sufficient acreage of good pasture.

Strawberries are the most valuable small fruit grown in Missouri and are produced commercially in the southwestern part of the Ozark Region. Due to droughts in recent years, the Missouri crop in 1939 was one-fifth that of 1929, when Missouri ranked first in production.[7]

MINERAL RESOURCES

The Ozark uplift, contact metamorphism and the work of under-

[4] Miller and Krusekopf., *op. cit.*

[5] Helm, C. A., Meadow and Pasture Management in the Ozarks, Missouri Agricultural Experiment Station., Bulletin 234.

[6] *Ibid.*, pp. 24-31.

[7] Figures are from the preliminary report of October 6. 1941. of the Sixteenth Census.

ground water have contributed toward the formation of important mineral deposits in certain parts of the Ozark Highland area. Of outstanding importance are the lead ores of Madison and St. Francois counties, located some 80 miles south of St. Louis (Fig. 5). These deposits have placed Missouri in first place in lead production for many years. The principal ore is galena, the black sulphide of lead, which runs on the average around 75 per cent lead.[8] Some silver and copper are produced as by-products in the smelting of the lead ore. In 1937 the lead concentrates mined in Missouri were valued at $14,700,000. During the present war year (1942) both production and value, of course, will exceed the 1937 figures.

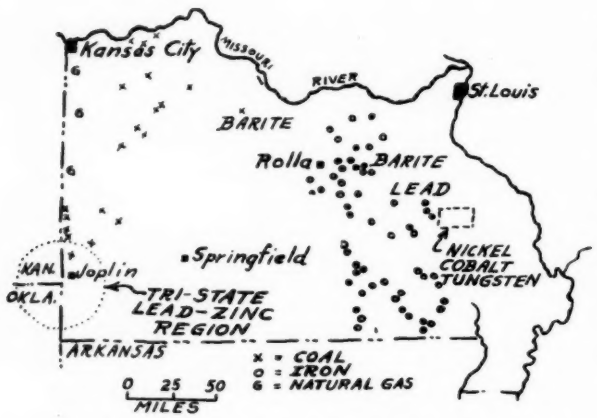

FIG. 5. Map of southern Missouri showing distribution of principal natural resources. (From preliminary report of Missouri State Planning Board, 1934.)

Southwestern Missouri, southeastern Kansas and northeastern Oklahoma are included in the famous Tri-State mining region (Fig. 5). This is the greatest zinc-producing area in the world. Joplin, Missouri, is the trading center. The principal ore is sphalerite, the sulphide of zinc, locally called "jack." With the sphalerite are found such minerals as galena, calcite, pyrite, quartz, and occasionally some of the copper ores. Anyone interested in collecting minerals should visit the Tri-State region. Many filling stations carry as a "side line" very impressive collections of rocks and minerals. Just west of Joplin is a museum in which are some huge specimens of local minerals. The Tri-State area is dotted with enormous, white chat piles. The chat is chert or flint brought to the surface from the zinc mines. It is used in the construction of automobile highways and by railroads in resurfacing right-of-ways.

The year 1941 was the best production year in the Tri-State region since 1929.[9] In 1941 the total value of zinc shipments was over $24,000,000 and of lead shipments $3,500,000, a gain of some

[8] Biennial Report of State Geologist, 1941, p. 51.
[9] *Kansas City Star*, January 6, 1942.

30 per cent over 1940. Within the Tri-State region, Oklahoma is by far the principal producer, Kansas second and Missouri third. Missouri zinc mines were largely exhausted during the first World War.

Missouri ranks first and Georgia second in the production of barite (barium sulphate). Barite is a heavy white mineral, often stained yellow-brown by limonite. There are two principal producing areas, one located in the southeast, near the lead district, and the other near the center of the state, not far from Jefferson City. Barite is a constituent of lithopone. Recently barite has found increased use as "baroid," a finely ground powder used in the drilling of oil wells. Since barite is very heavy, it aids in forming a heavy mud which is valuable in controlling high gas pressure.[10]

Additional mineral resources of the Ozark region include iron ores, building limestone and marble, clay, coal and others of lesser importance.

Of much interest are the big springs to be found in this area. So-called "Big Spring" in extreme southeastern Missouri is the second largest spring in the United States, the largest being in Florida. The location of a huge military training camp near Rolla[11] resulted largely from the presence of abundant supplies of fresh water.

SUMMARY AND OUTLOOK FOR FUTURE PLANNING

An uplift of igneous rock followed by thousands of years of stream erosion has created the Ozark upland area of southern Missouri. Abundant rainfall has carved an almost perfect drainage pattern. Underground water in the tilted layers of sedimentary rocks has produced rich mineral deposits, beautiful caves and large springs of clear, cold water. This is an unglaciated region. The thin residual soils derived largely from cherty limestone and sandstone are poorer than the glacial-loessial soils of northern Missouri. Deciduous forests and grass cover the hills and valleys. The unproductive nature of the region with its hilly topography has discouraged railroad building and the area has remained somewhat isolated for many years. Recent building of automobile highways has greatly aided the development of the Ozark area. Mineral and agricultural products contribute much toward the total wealth of the State of Missouri. Water power is abundant but as yet little developed.

[10] Biennial Report, State Geologist, 1941, p. 39.

[11] The Missouri State School of Mines and Metallurgy is located at Rolla.

In its relations with surrounding regions the Ozark area furnishes a market for manufactured goods of many kinds and in return ships out great quantities of fruits, vegetables, minerals and forest products.

Future development will probably concentrate on: (1) production of greater numbers of grass-fed cattle, (2) more extensive fruit production, (3) mining and quarrying, (4) forestry, (5) widespread distribution and use of hydroelectric power, and (6) the exploitation of the excellent summer resort possibilities of the region.

ACTIVITIES OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

THOMAS F. BARTON, Secretary

POSTPONEMENT OF THE 1942 CONVENTION

At the eleventh hour, or just about two weeks before the annual meeting was to have been held in Columbus, Ohio, on December 30, 31, and January 1, 1943, it was indefinitely postponed. This action was taken as soon as the national officers received word that the Association of American Geographers would not hold its meeting.

Up to the time our annual meeting was postponed, the secretary had received most of the annual reports from chairmen of the standing committees, abstracts of papers which were to be read on our program, and reports from the state councils.

The postponement of our meeting was not only a disappointment to our members, but it also created several problems. Four of these problems have been presented to the Executive Committee.

EXECUTIVE COMMITTEE ACTION IN JANUARY, 1943

In January, 1943 the secretary sent a mimeographed letter to all members of the Executive Committee and presented the following problems: 1. Do you wish a meeting of the Executive Committee to be called in some city which is conveniently located for most of us? 2. Do you wish to receive a report of the nominating committee, appointed during the fall by Dr. Cunningham, or do you want to continue the same officers and "elected" committee members for

another year? 3. Should our annual meeting be postponed until after the war is won, or should we wait and take the same action the A.A.G. does? (I believe the latter is the customary procedure.) 4. Should I prepare a short article containing (1) a brief summary of annual reports of standing committee chairmen, and (2) list of directors, (3) the present action of the Executive Committee, and (4) the treasurer's report to be published in the JOURNAL OF GEOGRAPHY?

The Executive Committee voted to carry on the business of our organization by correspondence if possible. Consequently, if anyone has a problem which requires official action, write to any member of the Executive Committee and in turn the problem will be presented to the entire committee for action.

All committee members agreed that the national officers should remain in office for another year, and in addition, four members thought that these officers should hold office for the duration.

Various opinions were expressed concerning the postponement of our annual meeting until after the war. However most of the members took the position that no decision on the matter should be made at the present time.

As to the fourth problem on the list, namely, the preparation of a short report by the secretary, the committee unanimously approved, with the provision that no meeting should be held this year. It appears now that no meeting will be held, and this report is the result. The consensus of opinion is that short reports about the activities of the National Council of Geography Teachers should appear from time to time in our official magazine, the JOURNAL OF GEOGRAPHY.

SUMMARY OF ANNUAL REPORTS OF STANDING COMMITTEES

Distinguished Service Award Committee, S. S. Visher, Chairman

"The Committee of Award has awarded the Distinguished Service to Geography Award for 1942 to Professor Ellsworth Huntington of Yale University.

"The committee consisted of Guy-Harold Smith, M. M. Svec, Helen M. Strong, S. S. Visher, J. R. Whitaker, and ex-officio President F. Cunningham and Secretary Thomas Barton."

Ellsworth Huntington, Yale University's eminent geographer, was the recipient of the National Council's 1942 Award for Distinguished Service to Geography. The following is an abstract of the presentation remarks prepared by the chairman of the Committee of Award (G. H. Smith, Helen Strong, M. M. Svec, S. S. Visher, J. R. Whitaker, F. F. Cunningham and T. F. Barton).

Dr. Huntington is known to all members of the Council because of his several successful textbooks, his numerous thought-provoking articles and his many scholarly

books. The textbooks of which he is chief or sole author include a series for elementary school pupils (one of which is a popular reader on Asia), an economic geography for high school pupils, and three for college students. His other books include *The Pulse of Asia, Palestine and its Transformation, Civilization and Climate, World Power and Evolution, The Climatic Factor, Climatic Changes, Earth and Sun, The Red Man's Continent, The Character of Races, West of the Pacific, The Human Habitat, The Pulse of Progress, The Builders of America, After Three Centuries, Weather and Health, Tomorrow's Children, Season of Birth.*

Dr. Huntington is the world's most widely known geographer because parts of his work have interested many sorts of people, including historians, archeologists, anthropologists, economists, sociologists, ecologists, geologists, meteorologists, climatologists and eugenicists, as well as nearly all varieties of geographers.

He has attained this position of world prominence not only because of the large volume of diversified work, but because he has gathered vast volumes of facts and made excellent use of them and has advanced various challenging generalizations or principles, several of which have aroused much thought and discussion.

Numerous honors have come to Dr. Huntington, two of the earliest of which were medals from the leading British and French geographical societies for his explorations in Asia and his effective accounts thereof. He has been president of the Association of American Geographers, of the Ecological Society and of the Eugenics Society.

The bestowal of this Award by the National Council is in recognition of our debt to Dr. Huntington for much aid in our efforts to increase the service of geography to the nation and to civilization.

S. S. VISHER, *Chairman*

COMMITTEE ON TESTS, Marguerite Uttley

"The committee on tests has not been able to standardize the Fourth Grade Geography Test because we have not accumulated scores from 1000 children. We received the scores of 304 children in 1941, and of 279 in 1942.

"We have prepared many test items for other tests but have not proceeded with try-outs because of the heavy expense involved. We were granted the right to spend money for try-outs, but we do not believe it wise to do so until we can be convinced that the Fourth Grade Test is really being used. Any one or several of the following factors might account for the poor sales of the Fourth Grade Test.

1. The quality of the test.
2. The lack of norms in the handbook of instructions
3. The publishing company
4. The amount of advertising in the JOURNAL OF GEOGRAPHY and in general educational magazines which administrators and supervisors read
5. The availability of a geography test for only one grade, instead of a series of tests for grades 4, 5, 6, and 7

"There is another aspect aside from the question of investment of a considerable sum of money which troubles us. Is it advisable to construct and try out tests in geography in unstable war times and have tests which might prove unsuitable for post-war use?"

COMMITTEE ON CLASSIFICATION OF CLIMATES, E. E. Lackey

"Stress of circumstances, the war emergency, and preoccupation with many details has prevented the Council's Committee on Climatic Regions and Nomenclature from conferring during the current year. However, the chairman, following suggestions and leads gleaned from the compilation of responses to last year's questionnaire, has constructed a map which is submitted to the Board of Directors of the National Council. This maps represents some progress, and is made with the request that the committee be continued and asked to report again next year."

Dr. Lackey has about one hundred copies of the map which the committee prepared and interested persons may write to him.

COMMITTEE FOR SUMMARIZING AND ABSTRACTION IN GEOGRAPHIC EDUCATION, Nora Zink

"I have just sent to Miss Thralls my material on "Research in the Teaching of Geography." It consists of 363 pages (double-spaced typing) and includes bibliographies of both unpublished and published research work, abstracts of theses and dissertations, and summaries of findings of both published and unpublished investigations.

"To date, I have read 373 theses and dissertations. However, because some were not pertinent to geography or had been published, I considered only 281. Most of these are abstracted. The bibliography of published studies contains 196 names.

"In February or March I shall again round up the unpublished material and if at that time the work which I have now finished is not published, this new survey can be incorporated in the old; if publication has already proceeded too far, the report on these later studies can be made elsewhere."

RESEARCH COMMITTEE, Edith Parker

No report.

COMMITTEE TO INVESTIGATE THE POSSIBILITIES OF PUBLISHING MISS ZINK'S REPORT, Zoe A. Thralls

Miss Thralls reports that her committee and Miss Aitchison's committee on Publications are investigating possibilities of publishing Miss Zink's report.

EDUCATIONAL RELATIONS COMMITTEE, Anne M. Goebel

Miss Goebel was in Washington, D.C. when my letter requesting an annual report arrived and she was unable to give a detailed report. Her activities for 1942 centered primarily on preparing programs for the Geography Section of the National Education Association when it held its annual meeting in Denver, Colorado.

COMMITTEE ON PUBLICATIONS, Alison Aitchison

"Again the committee reports little accomplished. This year seems to have brought many extra loads to most of us. Our duty, we were told is to be on the alert for geographical material suitable for publication and circulation among those who are in a position to benefit by it. Since we have no funds at our disposal this would generally mean seeking publication through the columns of the JOURNAL and the distribution of reprints or by recommendation to the council that publication be undertaken by the N.C.G.T.

"May we suggest some lines on which superintendents and teachers might be glad to have help.

1. Geography courses suitable for high schools—not merely something for the duration
2. Detailed information on map selection—especially minimum equipment for maximum usefulness
3. Bibliographies, classified and annotated in such a way that a teacher with limited money for books might have a good idea whether the material would be helpful and in what lines
4. A revision of the standards of attainments and objectives which were published in the 32d yearbook

"If any of these suggestions seem worthwhile . . . please notify the chairman of the Publications Committee so that we can attempt to find someone with spare time to work on them."

COMMITTEE ON STANDARDS OF CERTIFICATION FOR THE TEACHING OF GEOGRAPHY IN HIGH SCHOOLS, Alfred H. Meyer

"At the New York Council meeting last year the Committee on Standards of Certification for the Teaching of Geography in the High Schools, through its chairman, presented the committee's report to the Board of Directors and the Executive Council. This report embraced the following: 1) a survey of the high school geography teacher training and certification standards in the states, 2) a twofold classification of such standards as a basis for determining desirable revisions of standards, 3) the formulation of the so-called 'Geography Master Standards Pattern' as a specific yet flexibly adaptable guide for the correction of the present deficiency in teaching standards, 4) a promotional program seeking the adoption of the Geography Master's Standards Pattern by school and state agencies concerned with teacher training and certification, and 5) a recommendation that the Council appoint a subsidiary High School Geography Curriculum Committee to work out a systematically graded four-year high school geography program with reference to courses, texts, syllabi, and tests.

"This report after several minor modifications was approved by the Council at the New York meeting last JANUARY.

"On June 3, 1942 Miss Edith P. Parker,, Chairman of the Research Committee, reported that the petition of the Standards Committee for $500.00 to support this research and promotional project had been granted unanimously by the Research Committee.

"Upon receipt of this information the Standards Committee proceeded to adapt the original report to the audience whom we were to address.

"By a unanimous vote it was decided that the subject matter of our report be handled discriminatingly with respect to the two different audiences with which the general problem of standardization was concerned; namely, the general educator, and secondly, the geographer. The first paper, the one addressed to the "Educators and Administrators of Secondary Teacher Training and Certification" was published in the February, 1943 issue of the JOURNAL OF GEOGRAPHY. The second paper to be addressed to The Geographers, particularly those in administrative authority, is now in preparation. The objective of this latter paper is to show the imperative need of adapting the organizational and instructional machinery of geography departments to meet the challenge of the demands for geographic training suited to modern educational programs.

"The National Council for the Social Studies, a department of the National Educational Association, has just announced its war-time policy under the title of 'The Social Studies Mobilize for Victory.' Under the sub-title "Study of Geography Must be Increased" the Social Studies Council makes the plea *'At least a full year of systematic study of social geography, closely related to other social studies courses, and preferably to precede the study of world history, should be required of all secondary pupils.'*

"It appears to us that this is the most encouraging gesture for the effective promotion of secondary geographic education yet made by any non-geographic organization. We hail the far-sighted vision thus expressed by the Social Studies Council.

"We wish also gratefully to acknowledge the moral and financial backing given by all the officials of our own Council who in any way or another have supported the Standards Committee program.

"The chairman is personally indebted to the various members of the Standards Committee for their invaluable counsel and constructive cooperation in completing this first step towards solving the high school geography problem.

"However, this is only the first step. The ideals and objectives have now been set up. Under the Geography Master Standards Pattern we are asking school administrators to certificate and employ only geographically trained teachers for geographic instructional purposes.

"But are the college geographers prepared to supply the kind of training called for under the Geography Master Standards Pattern? Are the number and distribution of geography departments adequate to meet the regional instructional demands in the various states? Are the courses of such departments as now exist adapted to the needs of secondary education? Do the departments offer, for example, a course in the Teaching of Secondary Geography? Are the departments which combine geography and geology ready to supply the geographic organization, staff, and courses specifically adapted to train the high school teacher who is to be employed for the one-year Social Geography course requested by the National Council for the Social Studies as a minimum geographic education for every high school pupil? Are we prepared to supply the secondary teacher with aviation geography training adapted to the high school level?

"We share the view of many geographers that we shall soon experience a real renaissance in geographic education in America. It is hoped that this time geography will enter the high school curriculum to stay. Our emphasis at present on geographic training must not be simply to satisfy the immediate objectives of war-time geographic requirements, but to plan also for the long range peace-time needs of our program.

"Above all, our high school program in order to survive must be practical, flexible, and adaptable to the educators' demands for citizenship training. In our judgment we may well heed the advice and admonition of Dr. Samuel Van Valkenburg: "Planning of a postwar world is above all a geographical problem, and if the American geographer does not rise to the occasion, the practical side of his profession has met with complete failure, and geography is once more relegated to the classroom. *Even there it has lost its source of inspiration, because it is no longer backed by the power of action.*"

"But the National Council wants action and has acted to get action. Such action calls for a concerted and cooperative endeavor on the part of all geographers."

COMMITTEE ON LOCAL SURVEY, L. C. Davis

No report.

COMMITTEE TO ANSWER MISCELLANEOUS INQUIRIES, Zoe A. Thralls

"I am the only member. I have answered by letter all questions which came directly to me or were forwarded to me either by Mr. Cunningham or by Mr. Barton. Some requests for information were received also from N.E.A. In all, I have probably answered fifteen (15) or twenty (20) inquiries. The questions have mainly dealt with requests for references, suggestions for units of work, and sources of information."

COMMITTEE ON MEMBERSHIP, Katheryne Thomas Whittemore

"The committee on membership as appointed by Dr. Cunningham consists of Dr. J. E. Switzer, Dr. H. Harrison Russell, and the undersigned as chairman. Work has been carried on entirely by correspondence. The Committee is still in the process of collecting ideas from various members of the organization, and defining its problem. It has not begun to solve its problem."

COMMITTEE FOR COLLECTING SEASONAL DATA THROUGH THE CO-OPERATION OF SCHOOLS, Alice Foster

"The project started experimentally in 1941 for the collection of seasonal data through the co-operation of schools (JOURNAL OF GEOGRAPHY, September, 1942, pp. 234-

236) still was held during 1942 to the belt of plains country from the Gulf to the Canadian border. The project was expanded by increasing the number of states and by forming a committee whose members were asked to serve as state chairmen. The personnel of the committee is as follows: Wisconsin, Mary Jo Read, State Teachers College, Milwaukee; Minnesota, Anna C. Larson, State Teachers College, St. Cloud; Illinois, Neva McDavitt, Illinois State Normal University, Normal; Kentucky, Mark Marks, Western Kentucky Teachers College, Bowling Green; Alabama, Lillian Worley, State College for Women, Montevallo; Florida, Gladys Fawley, State College for Women, Tallahassee; Louisiana, Minnie Kelley, Southwestern Louisiana Institute, Lafayette. In addition, Dorothy Haffa (Junior High School, Marion, Iowa) served as chairman for Iowa for a while in the spring. Though appointed very late, Miss Haffa got the work started promptly and sent in a collection of data at the close of the school year. However, because of extra work which she was to be responsible for in 1942-43, she resigned her place on the committee in June, and her place has not been filled.

"In general, the 1942 appointments were made too late for state chairmen to get their organizations set up and their plans made so that the "footsteps of spring" might be traced across the country. Again, the national chairman was busy about other matters when it was time to initiate the autumn work. Thus at the close of the year, not enough data have come in to justify an attempt at correlation. The status of the work in the various states is not uniform, but enough has been done to serve as a foundation for future work, if the Board decides that the project should be continued.

"Replies have come from five state chairmen in response to a recent letter asking for opinions regarding the feasibility and value of the project. Chairmen who replied express the belief that making the observations and keeping the record constitute a valuable educational experience for the classes that participate, and that wartime conditions do not necessarily detract from interest in seasonal change but may even strengthen that interest.

"The extra load carried by people in teachers colleges during the wartime emergency complicates the matter of handling the work of the state chairmanships, but probably the second year of a chairmanship would not involve as much work as the first. The five who replied expressed a willingness to continue for another year as chairmen if the project is continued.

"Certain difficulties and problems remain to be solved. (1) The lists of items for observation as prepared by state chairmen should be compared and correlated so that a few key items may appear on all lists if possible, these being items of wide latitudinal application. In addition to these, there should be enough variety to make lists fit local conditions. (2) The preparation of copies for distribution to teachers is a task of considerable weight. For best results, there should be an official list for each co-operating teacher this record sheet to be marked weekly. Then there should be copies, probably on paper of a different color, for each student of the co-operating classes to keep in his notebook, these record sheets to be marked on any day when some new phenomenon has been observed. Probably most teachers who might be willing to co-operate would not have the material facilities or the time to prepare individual record sheets. A way to get these prepared for many localities has not been found.

"As the year draws to a close, the chairman is only partly satisfied with results accomplished, but she believes that the committee as constituted is ready to do effective work in 1943. She recommends that expansion into other states be postponed for at least another year while the technique of administering observations in plains country is advanced further.

"This closes the period for which I agreed to handle the project. If the Board decides that the project should be continued, I shall be happy to pass on to the new chairman whatever I have gained through the experience of starting the project."

ANNUAL REPORT OF THE TREASURER
NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

December 16, 1942

GENERAL TREASURY REPORT

(Money other than Research Fund)

Dec. 16, 1941, Amount in general treasury fund		$ 590.56
Funds received, Dec. 16, 1941—Dec. 16, 1942:		
Jan. 1, Interest, Duluth National Bank	$ 2.26	
June 9, A. J. Nystrom, subscriptions; 88 @ 25¢	22.00	
Dec. 5, A. J. Nystrom, subscriptions; 246 @ 25¢ (?)	61.50	85.76
		$ 676.32
Funds expended, Dec. 16, 1941-Dec. 16, 1942:		
Jan. 4, Thos. F. Barton, Postage & 2 guest dinner tickets	$ 11.77	
Jan. 8, Barbizon Plaza Hotel, w. fees & N.Y. sales tax	20.82	
Jan. 18, Julius Lewin & Son, Dinner tickets (Renner)	2.00	
Jan. 18, Thos. F. Barton, Secretary's 1941 honorarium	25.00	
Jan. 18, World Fed. Educ. Ass'n, Annual dues for 1942	25.00	
Jan. 18, Geo. J. Miller, Half cost convention programs	38.87	
June 22, Carbondale Herald, 5,000 letterheads (T.F.B.)	22.50	
July 11, Carbondale Herald, 8,000 letterheads (T.F.B.)	37.00	
Dec. 8, Thos. F. Barton, Secretary's 1942 honorarium	25.00	
Dec. 8, Thos. F. Barton, Reimburse postage, etc. spent	32.97	$ 240.93
		$ 435.39

RESEARCH FUND REPORT

Dec. 16, 1941, Amount in Research Fund treasury		$3,890.10
Funds received, Dec. 16, 1941-Dec. 16, 1942:		
Jan. 1, Interest, Duluth National Bank	$ 19.00	
Jan. 24, McKnight & McKnight, Royalty, Geographic series	48.22	
Feb. 28, Jno. Wiley & Sons, Royalty, Conservation	107.55	
Sept. 24, Jno. Wiley & Sons, Royalty, Conservation	136.00	$ 310.77
		$4,200.87
Funds expended, Dec. 16, 1941-Dec. 16, 1942:		
April 18, A. H. Meyer, Committee expenses	$ 16.42	
June 26, A. H. Meyer, Committee expenses	24.21	$ 40.63
Dec. 16, 1942, Total amount in Research Fund Treasury		$4,160.24
Dec. 16, 1942, Total amount in General Treasury (as shown above)		$ 435.39
Dec. 16, 1942, Total in General Treasury and in Research Fund		$4,595.63
Dec. 16, 1942, In checking account, Duluth National Bank	$ 148.65	
Dec. 16, 1942, In interest account, Duluth National Bank	4,446.98	
Dec. 16, 1942, Total funds on deposit, Duluth National Bank		$4,595.63

GEO. H. PRIMMER, *Treasurer*, State Teachers College, Duluth, Minnesota

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EDITORIAL NOTES AND NEWS

The eastern seaboard normally received a large percentage of its petroleum from a fleet of oil tankers operating between the Gulf and Atlantic coasts. The remainder came by railroad tank cars operating from the producing fields or from the nearest pipe line terminals, none of which extended to our east coast. When war was declared, this tank line became the goal of the Axis submarine warfare. Also, some of the tankers had to be routed elsewhere to supply the far flung needs of the United Nations, for, as the war progressed, the oil distribution pattern of the world became subject to frequent alterations. Submarine activity was particularly hard on Venezuelan and Colombian oil production as both countries depended on tankers to take the crude or refined oil to overseas markets beyond the Caribbean. Many of these oil tankers from the Caribbean or from our Gulf Coast or California oil fields carried oil to England, Australia, or to the Mediterranean via the South Africa-Red Sea route. No wonder eastern United States was the first area of the United States to experience an acute oil shortage. To help alleviate this shortage, a 24-inch pipe line was recently laid from Longview, Texas, to Norris City, Illinois, a distance of more than 500 miles. Never before has a pipe line of such dimensions been laid. When operating at full capacity, this "Big Inch," as the oil men call it, can furnish daily 300,000 barrels of oil to east-bound rail tank cars lining up at Norris City. This line will be extended east as fast as time and priorities permit, and may get to New York and Philadelphia by early summer. Most of the extension will be 24 inch line, the remainder being 20 inch line. According to reports from various oil companies this line, which will be more than a thousand miles long, will hold, when full, four million barrels of oil, and should be able to deliver daily as much oil as a fleet of 150 tankers, each having a 10,000 barrel capacity. This pipe line is a government-owned project of Defense Plant Corporation, a subsidiary of R.F.C. It is operated by War Emergency Pipelines, Inc., a non-profit organization of the leading oil companies normally supplying oil to the Atlantic seaboard. Speculation is rife as to what disposal will be made of the pipe line at the close of the war, and as to how tankers will meet the competition of the "Big Inch."

The Geography Club of Western Pennsylvania held its spring conference in the Frick Public School, Pittsburgh, on April 10. Participating in the discussion, "Practical Applications of Geography Broadcasts," were: Mrs. Linnie B. James, Forest Hills Junior High School; Luella N. Dambaugh, Conroy Junior High School; M. Graham Netting, Carnegie Museum; and Wm. N. Tuach, A. J. Nystrom Company. Wm. N. Robson, Registrar of Deeds for the City of Pittsburgh, acted as moderator. Thelma Waddle, Frick Elementary School, gave a geographic analysis and interpretation of a film, "Aluminum." The luncheon speaker was Dr. W. J. Nystrom of the University of Pittsburgh. Exhibits of teacher and pupil materials were prepared by Mrs. Linnie B. James and Miss Lavina Henderson, Linwood School.

The Study of The Interrelationship Between Man and His Environment—Its Place In the Peacetime Curriculum was the topic of the recent Roundtable discussion at the Geography Sectional Meeting of the Society for the Experimental Study of Education of the New York City schools. David J. Swartz is the Society's Chairman. The following participated in the discussion: George F. Pigott, Jr., Associate Superintendent; William A. Hamm, Assistant Superintendent; Mary A. Kennedy, Assistant Superintendent; Alberto C. Bonaschi, Vice-President, Board of Education, William Jansen, Assistant Superintendent.

The joint meeting of the Ohio State and North Eastern Ohio Councils of Geography Teachers was held at Cleveland on April 3. J. T. Maddox, Euclid, presented a paper on "War Maps in Current Periodicals," and Carol Sayers, Kent State University, read one on "What the Prospective Teacher Hopes to do in Geography." Edna Eisen, Kent State University, presided at the discussion period which centered on "The Role of Geography in Schools in the War Period." Participants included Albert J. Dillehay, Executive Director of Curriculum and Instruction of Akron Schools, Dean J. L. Blair, Kent State University, Mrs. Ethel K. Howard, Lakewood, together with teachers from the co-operating schools. The luncheon address, "Geography in a Global War," was given by John H. Garland, Western Reserve University.

Our preparation for and participation in war has resulted in some striking shifts in population. Estimates indicate that at least a half a million people have moved within a radius of 200 miles from Philadelphia. Cities concentrating on the manufacture of war materials have boomed. Typical of the latter are the gains in the shipbuilding centers along the Delaware and the metal-fabricating cities on the coast of Connecticut. Washington, D.C., with its governmental agencies and vast clerical forces probably reflects a gain in population of 25 per cent. On the other hand, Atlantic City normally serving as an amusement center for tourists has faced a rapid decline which it is heroically trying to check by converting to a hostelry for service men.

According to a report from the U. S. Department of Commerce, guayule shrubs were being harvested during this past winter on a 13-year-old guayule plantation in the Salinas Valley of California, which has been purchased by the Government. The yields of rubber are highest in the winter. Samples indicated a probable yield of 600 tons of rubber which is to be turned over to the Rubber Reserve Company for allocation to war uses. The plantation yielded a bumper seed crop in 1942. Nursery acreage has been increased in the Salinas area, and new nurseries established at Indio and Oceanside, California. Other plantations have been started near Bakersfield, California; Phoenix, Arizona; Las Cruces, New Mexico; and Brownsville, Texas.

A recent report from the U. S. Department of Commerce announces the completion of a pipe line across the Florida peninsula from Carrabelle (near Pensacola) to Jacksonville. Its daily capacity is estimated to be 35,000 barrels. It is expected to serve as a link in the movement of petroleum products between the Intracoastal Canal on the Gulf and the Atlantic Intracoastal Canal.

The sharp curtailment of fuel oil shipments to the east coast has been a boon to the anthracite mining region of eastern Pennsylvania. The oil tankers from the Gulf could deliver oil so cheaply that the coal mining companies could not meet the competition. The result was especially critical in the Scranton area. Then came the submarine activity on the oil tankers and the Scranton area again looks hopefully toward increased coal-mining activities and to the setting up of a number of industries. Owners of unused factories and vacant homes are anticipating new leases.

GEOGRAPHICAL PUBLICATIONS

A. J. Sardley. **Aerial Photographs: Their Use and Interpretation.** 203 pp., 328 plates and figures. First volume of Geoscience Series, Cary Croneis, editor, with the editor's introduction. Harper & Brothers, New York, 1942. $2.75.

This book fills a great need at present for it is the most complete treatment in the field of aerial photographs that has appeared. The author is a teacher of long standing who has put his experience in the book so that it contains practical exercises and sufficient material for an excellent course in the use of aerial photographs.

The first chapter takes up the uses and limitations of aerial photographs, a discussion of the cameras used in the photography, and an explanation of scale and orientation of photographs. Then follow the principles that govern stereoscopic vision, the types of stereoscopes and contouring vertical photographs, a discussion of mosaics, and the interpretation of culture on aerial photographs. Geologic maps are taken up next with a full treatment of geologic methods of tracing outcrops and contacts, and the book ends with oblique aerial photographs for reconnaissance mapping and tactical interpretation with specific military employments. One hundred and four pages are devoted to geologic maps so that it will appeal to teachers of geology or geography. After each chapter is a list of good references.

There are some errors, most of which have been copied from other references. The chapter on Culture is too brief and illustrated with only one plate, but there are many illustrations of geologic maps that could be used by the author for the interpretation of culture. Other examples of stereoscopic pairs set at the right distance for users of lens-type stereoscopes would be highly desirable. Also, many of the photographs are cut so that the scale does not show, and there is no colored photograph. In spite of these criticisms, the book is a first class presentation of aerial photographic work.

HAROLD B. WARD

Northwestern University

Darrell Haug Davis, **The Earth and Man, A Human Geography,** XXIII and 675 pp. 410 pictures and 452 maps and charts. The Macmillan Company, New York, 1942. $4.25.

There is no prescribed content of the general introductory course in geography for college students, and any author who attempts to write for this field may consider as alternatives, the writing of a rigorously organized course covering briefly the fundamentals of the subject, or a broadly planned book designed to cover almost anything a teacher might desire for instructional purposes. This text by Professor Davis is of the latter type, for it is broad in scope and presents the subject matter of geography in considerable detail.

The material of this book is organized into five major parts of unequal length, Part I consists of a brief introduction dealing with the history of geographic thought, the expansion of knowledge of the world, and the progress of mapping of the surface of the earth. Part II entitled "Man and Environment" and Part III on the "Limiting Effects of Environmental Factors," as indicated by the titles, are concerned largely with the physical conditions of the human habitat. In Part II the author discusses the importance of man as an agency in altering the character of the physical environment. This recognition of man as a positive factor in the shaping of his destiny will be favorably received by the teachers and students of human geography. These two sections which treat of environmental conditions cover more than half of the text.

The author next turns to the principal human activities in Part IV, which he calls "How Man Obtains His Living." His discussion is chronological or culturally sequential. He begins this section with a discussion of hunting and fishing of primitive peoples and follows this with a consideration of nomadism, agriculture, mining, and the more complex economic activities of modern industrial society. The latter part of this section devotes one chapter to commerce and industry which is a traditional topic in the field of economic geography. The next chapter on cities and urbanization, altho it is brief, is well done. As a newer branch of geography this subject is attracting more and more attention in American education. America has been rural and agricultural so long that we have only recently come to realize the importance of the urban agglomerations in our national life.

Part V of this book is the Appendix but instead of consisting of tables exclusively there are four chapters devoted to such subjects as maps and land survey, solar relations and time, the classifications of climates and the classification of soils. Many teachers, no doubt, would prefer to have much of the material in this section incorporated in the earlier parts of the text. For example, some will follow the discussion of the climatic elements with a consideration of the types of climate. This gives the student an opportunity to consider all of the climatic elements in combination instead of singly. The material is available in the text so the teacher may adapt it to his own pattern of presentation.

The numerous illustrations including pictures, and well executed diagrams and maps have been carefully chosen and integrate well with the text. Analysis of human and physical phenomena seems to be a principal objective of the author. On many occasions he calls attention to man's responsibility in respect to the physical resources of his environment. The reviewer misses a thorogoing discussion of regionalism as a credo of geography or as a major objective of geographic study. Perhaps the author could defend himself by this statement from the afterword: "Thus the study of both man and his environment becomes necessary for a proper understanding of our assets and our problems, a study of the earth according to its areal differentiation, which is geography, the one subject among the sciences whose field compasses, not a 'microcosm' but the entire surface of the earth."

GUY-HAROLD SMITH

Ohio State University

Nels A. Bengtson and Willem Van Royen. **Fundamentals of Economic Geography.** 802 pp., including 19 pp. principal publications consulted and 18 pp. index. 300 maps and other illustrations. Prentice-Hall, New York. 1942. $4.25.

This represents a considerable revision of the 1935 original edition, a "resharpening" of the "tools" for all users of the book. Changes lie not so much in the general manner of presentation as in modern statistical data and new graphic materials, including new larger-scale maps. A few new titles were added to some of the lists of selected references at chapter ends.

The chapter on "Geographic Importance of the Common Rocks" along with those on water power, fuels, and metallic and other minerals seem especially well done.

One should not discount the great value of the book on seeing a few typographical errors that escaped editing. Graver errors exist but, for the most part, are obvious and, consequently, harmless. The book deserves a wide use.

GEO. H. PRIMMER

State Teachers College,
Duluth, Minnesota